Collaborative Quiz #0 Sln,

ECE 345 / MF 380
Fall 2020
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Pre-Class Questions,

1. $sF(s) = \frac{1}{2}(R(s) - F(s))$

$$F(s)\left(s + \tfrac{1}{2}\right) = \tfrac{1}{2}R(s)$$

$$\frac{F(s)}{R(s)} = \frac{1/2}{s + 1/2}$$

2. $F(s) = \frac{1/2}{s+1/2} \cdot R(s)$ for $R(s) = 1/s$

$$= \frac{1/2}{s(s+1/2)}$$

3. $s^2 Z(s) = -n^2 Z(s) + n^2 F(s)$

$$Z(s)(s^2 + n^2) = n^2 F(s)$$

$$\frac{Z(s)}{F(s)} = \frac{n^2}{s^2 + n^2}$$

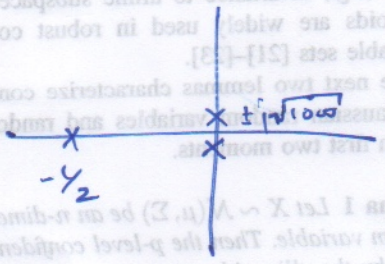
4. $G_{sat}(s) = G_{throttle}(s) \cdot G_{CWH}(s)$

$$= \frac{1/2}{s+1/2} \cdot \frac{n^2}{s^2+n^2}$$

$$= \frac{1/2 \cdot n^2}{(s+1/2)(s^2+n^2)}$$

In-Class Questions

1. (c)

2. 

3. $f_{ss} = \lim_{t\to\infty} f(t) = \lim_{s\to 0} s\,F(s)$

$= \lim_{s\to 0} s \cdot \dfrac{\gamma_2}{s(s+\gamma_2)}$

$= \dfrac{\gamma_2}{\gamma_2} = 1. \Rightarrow$ (a) is correct.

4. $Z(s) = G_{satellite}(s) \cdot R(s) \Rightarrow$ (c) is correct.

5. $Z(s) = G_{satellite}(s) \cdot \dfrac{1}{s}$

$= \dfrac{\gamma_2 \cdot n^2}{(s+\gamma_2)(s^2+n^2)} \cdot \dfrac{1}{s}$

$= \dfrac{A}{s+\gamma_2} + \dfrac{Bs+D}{s^2+n^2} + \dfrac{C}{s}$ ← $\underline{1}(t)$

$z(t)$: $e^{-\gamma_2 t}$ $\sin(n^2 t)$

(b) is correct because $z(t)$ will involve $e^{-\gamma_2 t}$ (exp. decay) $\sin(n^2 t)$ (oscillatory), & $\underline{1}(t)$ (unit step. No oscillatory elements are visible in (a) or (c), & (a) shows exponential growth, not decay.